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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
COLLINS, CYNTHIA E	

ART UNIT	PAPER NUMBER
1638	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,644	PLESCH ET AL.	
	Examiner	Art Unit	
	Cynthia Collins	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,4,5 and 32-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,4,5 and 33-37* is/are rejected.

7)☒ Claim(s) *32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 3, 2009 has been entered.

Claims 1, 3 and 6-31 are cancelled.

Claims 2 and 32 are currently amended.

Claims 33-37 are new.

Claims 2, 4-5 and 32-37 are pending and are examined.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

All previous objections and rejections not set forth below have been withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 2, 4 and 5 remain rejected, and claims 33-37 are rejected, under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to

reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention, for the reasons of record.

Applicants' arguments filed September 3, 2009 have been fully considered but they are not persuasive.

Applicants submit that the specification describes the sequence of SEQ ID NO: 1 that encodes SEQ ID NO: 2 by its actual structure, and Applicants note that the since the genetic code and its redundancies were known in the art at the time of filing, the disclosure of SEQ ID NO: 2, combined with the preexisting knowledge in the art, would have put one in possession of the genus of nucleic acids that encodes SEQ ID NO: 2. Applicants also submit that with the aid of a computer, one skilled in the art could have identified all of the nucleic acids that encode a polypeptide with at least 95% identity with SEQ ID NO: 2. Applicants further submit that, as described in the specification at page 83, lines 14-18 and 24-29, natural allelic variations can lead to alternations in the amino acid sequence of SEQ ID NO: 2 within a population, bring about a variation of 1-5% in the nucleotide sequence of the gene encoding SEQ ID NO: 2 without altering the functional activity of the protein. Accordingly, the claim scope created by the recitation of at least 95% sequence identity includes the expected range of natural polymorphic variants. (reply pages 5-6)

Applicants' arguments are not persuasive because the claims are not limited to the use of nucleic acid molecules that encode SEQ ID NO:2, or that encode polypeptides with at least 95% identity with SEQ ID NO: 2. The rejected claims also employ nucleic acid molecules that encode fragments of SEQ ID NO:2 which confer an increase in the amount of a fine chemical in an organism or part thereof, as well as nucleic acid molecules that encode polypeptides having at

least 95% sequence identity to said fragments and that retain the function. Neither the specification nor the prior art of record describe or exemplify such fragments or their variants. Further, the rejected claims additionally employ nucleic acid molecules that may be complementary to any part of any of the sequences set forth in parts a)-c) of claims 2 and 35. Neither the specification nor the prior art of record describe or exemplify such complements.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 35 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Qadota H. et al. (RHO gene products, putative small GTP-binding proteins, are important for activation of the CAL1/CDC43 gene product, a protein geranylgeranyltransferase in *Saccharomyces cerevisiae*. Yeast. 1992 Sep;8(9):735-41).

Claims 35 and 37 are drawn to a process for the production of fine chemical comprising stably increasing or generating in an organism or a part thereof the expression of at least one nucleic acid molecule comprising a nucleic acid molecule encoding of the polypeptide as depicted in SEQ ID NO:2 or a nucleic acid molecule comprising of the nucleic acid molecule as depicted in SEQ ID NO: 1, by introducing the nucleic acid molecule into the organism, and conferring an increase in the amount of the fine chemical in an organism or a part thereof, and

growing the organism under conditions which permit the production of the fine chemical in the organism, wherein the organism is a fungus.

Qadota H. et al. teach a process comprising stably increasing or generating in the yeast *Saccharomyces cerevisiae* (a fungus) the expression of at least one nucleic acid molecule comprising a nucleic acid molecule consisting of a nucleic acid molecule (SEQ ID NO:1) encoding of the polypeptide (RHO2) as depicted in SEQ ID NO:2 , by introducing the nucleic acid molecule into the yeast (page 736 column 1; page 737 Figure 1; page 738 Table 1 and Figure 2). The introduction of the nucleic acid molecule conferred an increase in the amount of the fine chemical (the RAS2 protein) in the organism, which was grown under conditions which permitted the production of the fine chemical (page 739 Figure 3).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2, 5, 32-34 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qadota H. et al. (RHO gene products, putative small GTP-binding proteins, are important for activation of the CAL1/CDC43 gene product, a protein geranylgeranyltransferase in *Saccharomyces cerevisiae*. Yeast. 1992 Sep;8(9):735-41) in view of Sano H. et al. (Expression of the gene for a small GTP binding protein in transgenic tobacco elevates endogenous cytokinin

levels, abnormally induces salicylic acid in response to wounding, and increases resistance to tobacco mosaic virus infection Proc Natl Acad Sci U S A. 1994 Oct 25;91(22):10556-60).

Claims 2, 5 and 32-34 are drawn to a process for the production of fine chemical comprising stably increasing or generating in an organism or a part thereof the expression of at least one nucleic acid molecule comprising a nucleic acid molecule encoding of the polypeptide as depicted in SEQ ID NO:2 or a nucleic acid molecule comprising of the nucleic acid molecule as depicted in SEQ ID NO: 1, by introducing the nucleic acid molecule into the organism, and conferring an increase in the amount of the fine chemical in an organism or a part thereof, and growing the organism under conditions which permit the production of the fine chemical in the organism, and recovering the at least one fine chemical produced by the organism, wherein the at least one fine chemical is an organic acid, and wherein the organism is a plant.

Claim 36 is drawn to the process of claim 35 wherein the organism is a plant.

The teachings of Qadota H. et al. are set forth above.

Qadota et al. do not teach a plant, or the recovery of an organic acid.

Sano H. et al. teach tobacco plants transformed with rgp1, a gene encoding a Ras-related small GTP binding protein. The transgenic plants taught by Sano H. et al. overproduce salicylic acid (an organic acid), which was recovered (page 10557 Figure 1; page 10558 Figure 3). The transgenic plants taught by Sano H. et al. also exhibit increased resistance to tobacco mosaic virus infection (page 10599 Figure 7).

It would have been *prima facie* obvious to one skilled in the art at the time the invention was made to introduce into a plant a nucleic acid molecule (SEQ ID NO:1) encoding of the polypeptide (RHO2) as depicted in SEQ ID NO:2, given that the RHO2 protein (a Ras-related

small GTP binding protein) and coding sequence were known at the time the invention was made, and given that a method for transforming plants with a Ras-related small GTP binding protein coding sequence was established in the art at the at the time the invention was made. One skilled in the art would have been motivated to do so in order to increase the resistance of the plant to viral infection. One skilled in the art would have had a reasonable expectation of success, given the successful production of tobacco plants transformed with rgp1. It also would have been *prima facie* obvious to one skilled in the art at the time the invention was made to recover salicylic acid from these plants, given that salicylic acid was known to be correlated with pathogen resistance (Sano H. et al. page10460), and given and given that a method for its recovery was established in the art at the at the time the invention was made. Accordingly, one skilled in the art would have been motivated to generate the claimed invention with a reasonable expectation of success. Thus, the claimed invention would have been *prima facie* obvious as a whole to one of ordinary skill in the art at the time the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Qadota H. et al. (RHO gene products, putative small GTP-binding proteins, are important for activation of the CAL1/CDC43 gene product, a protein geranylgeranyltransferase in *Saccharomyces cerevisiae*. Yeast. 1992 Sep;8(9):735-41) in view of Sano H. et al. (Expression of the gene for a small GTP binding protein in transgenic tobacco elevates endogenous cytokinin levels, abnormally induces salicylic acid in response to wounding, and increases resistance to tobacco mosaic virus infection Proc Natl Acad Sci U S A. 1994 Oct 25;91(22):10556-60) and Parker W.B. et al. (Dominant mutations causing alterations in acetyl-coenzyme A carboxylase confer tolerance to

cyclohexanedione and aryloxyphenoxypropionate herbicides in maize. Proc Natl Acad Sci USA 1990 Sep;87(18):7175-9).

Claim 4 is drawn to the process of claim 2 further comprising the following steps: (a) selecting an organism or a part thereof expressing a polypeptide encoded by the nucleic acid molecule characterized in claim 2; (b) mutagenizing the selected organism or the part thereof; (c) comparing the activity or the expression level of said polypeptide in the mutagenized organism or the part thereof with the activity or the expression of said polypeptide of the selected organisms or the part thereof; (d) selecting the mutated organisms or parts thereof, which comprise an increased activity or expression level of said polypeptide compared to the selected organism or the part thereof; (e) optionally, growing and cultivating the organisms or the parts thereof; and (f) recovering, and optionally isolating, the free or bound fine chemical produced by the selected mutated organisms or parts thereof.

Qadota H. et al. and Sano H. et al. teach the limitations of claim 2 as set forth above.

Qadota H. et al. and Sano H. et al. do not teach the limitations of claim 4.

Parker W.B. et al. teach a process comprising selecting a plant expressing a polypeptide (acetyl-coenzyme A carboxylase) encoded by a nucleic acid molecule; mutagenizing the selected plant; comparing the activity of said polypeptide in the mutagenized plant with the activity of said polypeptide of the selected plant; selecting the mutated plant which comprises an increased activity of said polypeptide compared to the selected plant (page 7176; page 7178 Figure 3).

It would have been *prima facie* obvious to one skilled in the art at the time the invention was made to make and select mutant transgenic plants that have an increased activity or

expression level of recombinant *Saccharomyces cerevisiae* RHO2 protein, given that the RHO2 protein and coding sequence were known at the time the invention was made, given that a method for transforming plants with a Ras-related small GTP binding protein coding sequence was established in the art at the at the time the invention was made, and given that methods for making and selecting plant mutants were well established in the art at the at the time the invention was made. One skilled in the art would have been motivated to do so in order to identify plant genes whose products affect the level or activity of a Ras-related small GTP binding protein. One skilled in the art would have had a reasonable expectation of success, given the successful production of mutants in plants. Accordingly, one skilled in the art would have been motivated to generate the claimed invention with a reasonable expectation of success. Thus, the claimed invention would have been *prima facie* obvious as a whole to one of ordinary skill in the art at the time the invention was made.

Remarks

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Collins whose telephone number is (571) 272-0794. The examiner can normally be reached on Monday-Friday 8:45 AM -5:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on (571) 272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Collins/
Primary Examiner, Art Unit 1638

CC